

CLAIMS:

1. A method for reducing sludge viscosity of a sewage sludge having a solids concentration of at least 10% (w/w), comprising the steps of:
 - 5 (a) increasing the pH of the sludge to the range of 9.5-12.5;
 - (b) selecting at least one step from (i) maintaining the sludge at the pH of (a) and at a temperature of 10-37°C for a period of at least one day, and (ii) adding one or more inorganic or organic chemicals to the sludge, such chemicals contributing to viscosity reduction;
 - 10 (c) incubating the sludge by maintaining the resultant sludge at a temperature in the range of 40-100°C for a period of time of at least one hour;
 - (d) subjecting the sludge to physical shearing or disintegration; and
 - (e) subsequently discharging the sludge.
- 15 2. The method of Claim 1 in which step (b)(i) is selected.
3. The method of Claim 1 in which step (b)(ii) is selected.
4. The method of Claim 1 in which both step (b)(i) and step (b)(ii) are
20 selected.
5. The method of Claim 1 in which at least one of a sodium or potassium salt is added in step (b) (ii).
- 25 6. The method of Claim 1 in which steps (c) and (d) are carried out simultaneously.
7. The method of Claim 1 in which steps (c) and (d) are carried out sequentially.
- 30 8. The method of Claim 5 in which the salt is at least one of sodium or

potassium chloride.

9. The method of Claim 1 in which an oxidizing agent is added in step (b) (ii).

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10. The method of Claim 9 in which the oxidizing agent is selected from the group consisting of oxygen, chlorine, perchlorate, perchlorite, hydrogen peroxide, nitric acid, sulphuric acid, potassium permanganate, sodium perborate and ozone.

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11. The method of Claim 1 in which the solids concentration of >10% is obtained using a screw press, belt press or a centrifuge.

12. The method of Claim 1 in which the sludge pH is adjusted to 10.5 – 11.5.

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13. The method of Claim 1 in which the pH of the sludge is adjusted to at least 12 for 2h and then to at least 11.5 for 22 h.

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14. The method of Claim 1 in which the sludge is held in step (c) at a temperature and for a time sufficient to eliminate microbial pathogens.

15. The method of Claim 1 in which the pH is increased using a mono or divalent hydroxide.

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16. The method of Claim 15 in which the pH is increased using lime.

17. The method of Claim 1 in which some or all of the shearing of step (d) is effected by the action of pumps.

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18. The method of Claim 1 in which at least one of the treatments occurs

in a batch procedure.

19. The method of Claim 1 in which at least one of the treatments occurs in a continuous procedure.

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20. A low viscosity sewage sludge prepared according to the method of Claim 1.

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21. The low viscosity sewage sludge of Claim 20 that has been further processed by physical, chemical and/or biological methods.

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22. A low viscosity sludge concentrate produced by the method of Claim 20 which has a viscosity suitable for application of the sludge to land by spraying, injection or other methods.

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23. A low viscosity sewage sludge prepared by the method of Claim 20 that is suitable for disposal.

24. Apparatus for reducing the sludge viscosity of a sewage sludge, comprising:

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- (a) a device for concentrating and/or dewatering the sludge;
- (b) a device in which the viscosity of the sludge obtained from the device of (a) is reduced;
- (c) a device to subject the sludge obtained from the device of (b) to shearing; and
- (d) means to control the flow and temperature of sludge, said means including means to subject the sludge to holding steps.

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25. The apparatus of Claim 24 in which the device of (a) is a screw press or belt press.

26. The apparatus of Claim 24 in which the device of (a) is a centrifuge or filtration unit.

27. The apparatus of Claim 24 in which the device of (c) comprises a
5 rotating toothed disc or impeller.

28. The apparatus of Claim 24 in which the rotating toothed disc or impeller has a tip speed of 1000-10 000 feet/minute.

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